Washington County Water Consortium

May 7, 2025
2 to 3:15 pm
Remote meeting – Zoom
(If you are not on the Consortium listserv, please email
Adriana.Atcheson@co.washington.mn.us for the Zoom link and access code)

Agenda

2:00 – 2:05 **Welcome**
Introductions, Announcements

2:05 – 2:35 **Biochar on Site and Land Management**

Topic: What biochar is and how it can be part of the process when conducting natural system land management.

Presenter: Todd Rexine – Conservation Director, Great River Greening

2:35 – 3:00 **Washington County Wood Waste Utilization Program**

Topic: Hear about the County's Wood Waste Utilization Program and potential projects.

Presenter: Adam Frederick – Environmental Operations Team Supervisor, Washington County Public Health & Environment

3:00 – 3:15 **Questions/Adjourn**

GREAT RIVER GREENING

Biochar On Site & Land Management

Todd Rexine, Great River Greening

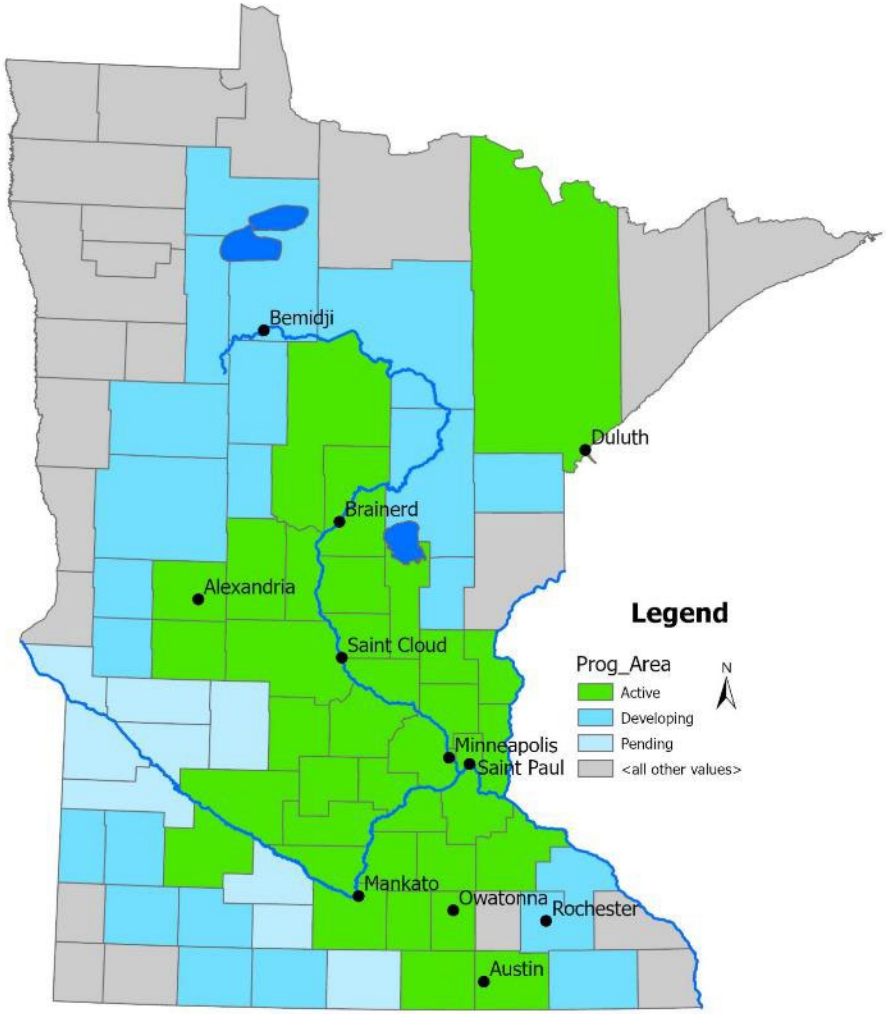
May 7, 2025
Washington County Water Consortium

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

Partial funding for this presentation was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR).

GREAT RIVER GREENING

Introduction



- We work with land managers to create resilient landscapes, address biodiversity loss, and sequester and store carbon through community-based stewardship.
- Our work began in 1995 with a massive volunteer tree planting project in Saint Paul along the Mississippi riverfront.
- We have since engaged MN communities in the restoration of approximately 45,000 acres at nearly 400 sites throughout Minnesota.

GREAT RIVER GREENING

Biochar

- Issues – Why Biochar
- What is Biochar?
- Equipment Needs
- Permitting and Documentation
- Process

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What is the need?

Lebanon Hills Regional Park, Eagan, Dakota County, MN
Oak Woodland and Oak Savanna Restoration

What is the need?

Seminary Fen

- Buckthorn burn piles
- Pile sizes: 20 ft x 20 ft x 10 ft;
  - (6 m x 6 m x 3 m)
- 15 Piles
  - Approx 750 cy of brush

What is the need?

Beginning in 2017, actions were in place to close biofuel plants in MN

Large volumes of shredded woody debris left on the landscape to decompose and release carbon

Brush pile burns: piles burned to ash and all carbon is released

Brush pile burn scar (2 years later)

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What is biochar?

Terra preta & Mollisols

5:1 reduction

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What is biochar?

50-90% Total Carbon

1cy = .7tons of carbon

Created through Pyrolisys

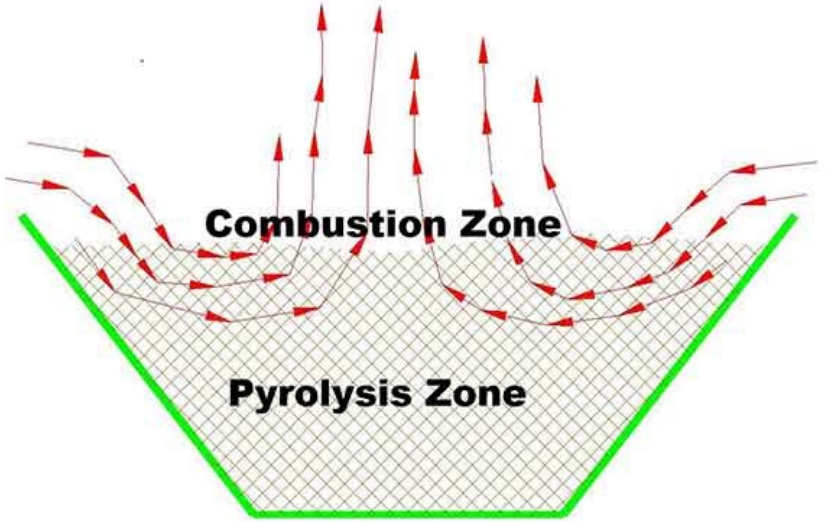

Image: biochar.international

Biochar Produced between 500-800 Celius (*932-1472*F*)

Produced below 400 Celius (*750*F*)

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Air Quality benefits

- Restoration work in suburban neighborhoods, adjacent to highways
  - No burn scars.
  - End up with a soil amendment
- MPCA has classified kilns as ‘open burning’,
  - - negligible to no change in pm2.5 particles
- Fire permitting agencies assess fire danger & air quality concerns when issuing burn permits
  - Embering is minimal to non-existent

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Biochar On Site

3 sizes of mobile flame capped kilns

- Oregon
- Ring of Fire
- Big Box

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Biochar On Site

Oregon Kiln

Team Lift

Solid bottom

Capacity 1.3cy (approx. 5 cy wood waste)

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Biochar On Site

Ring of Fire Kiln

Some Assembly Required
Open Bottom
Capacity 5cy (approx. 25 cy wood waste)

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Biochar On Site

Ring of Fire Kiln
– Some Assembly Required -

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Biochar On Site

Big Box Kiln

Capacity 9 cy full (approx. 45 cy wood waste)

10ft.x6ft.x4ft. – 1800#s empty (3,200#s full)

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Opportunities

Mix biochar with compost for future plantings

Public engagement

Spread it out on site

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Opportunities

Trillium growing up through biochar kiln burn location

Flame capped kilns can be used in areas with sensitive vegetation

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Opportunities

>80% Total Carbon (vs Ash)

- Rot Resistant
- Stable carbon storage for centuries

Tremendous Surface Area

- Microbial Habitat/Soil Health
- Nitrogen Sink ~2yrs
- Nitrogen Source >2yrs

MN Stormwater Manual – Potential benefits of Biochar

- Contaminant removal – metals & organics
- Support plant growth
- Retain water
- Slowly release nutrients
- Improve hydraulic properties

Slightly Alkaline (ph 9)

- Counter Anthropogenic Soil Acidity ?

Absorbs Chemicals

- Counter Allelopathic Plant Chemicals?

NRCS Conservation Practice 336

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Biochar Initiative

Internal

- ✓ **Flame capped kiln purchases**
- ✓ **Internal training**
- **Data collection** - ongoing

External

- **Natural systems**
  - Engage service providers, landowners, fire agencies, and the general public
  - Contract out GRG Field Crew to process biochar on site
- **Silvopasture**
  - Engage agricultural producers at trainings

Dissemination

- **Kiln access**
- **Share findings through networks**
- **Presentations**
- **Volunteer events**

Biochar Initiative

Internal

- **Data collection** – hours to process at varying scales

External

- **Natural systems – Work with Service Providers**
  - Arden Hills - Contracted use of Ring of Fire kiln
  - Carlos Avery WMA – Contracted use of Big Box kiln
  - ✓Belle Prairie County Park – Contracted use of Big Box kiln
  - Bend in the River - Contracted use of Ring of Fire kiln
- **MN Biochar Initiative** – Active member

Dissemination

- **June 20, 2025** – Kanabec SWCD Buckthorn Mgmt. Field Day
- **Sept 19, 2025 - USBI Conference** – Field day demonstrations
- **St Louis Park** – in conversations
- **Cook County SWCD** – in conversations

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Biochar Initiative

Outcomes Since 2023

- Facilitated 92 cy of biochar (50cy to date in 2025)

- Engaged with 500+ land managers, service providers, fire officials and community members

Demonstrations with practitioners, landowners, ag producers, and community members about biochar process

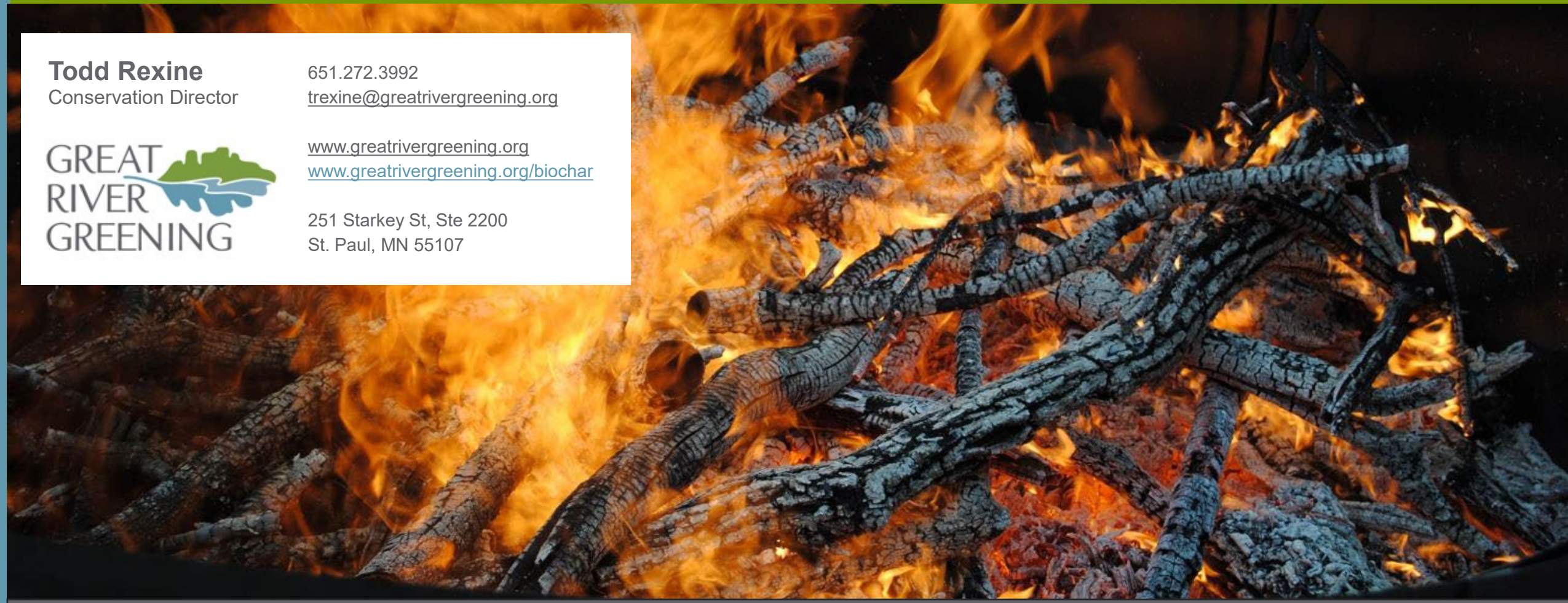
GREAT RIVER GREENING

What's Next?

Hit the road & share knowledge

- Conduct Statewide demos/trainings/presentations
- Kiln rental assistance
- Focused discussions with Ag producers
- Work with interested land managers to process biochar

QUESTIONS?



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Thank you to our supporters & funders

Thank you!

Wood Waste Utilization Program

Water Consortium

May 7, 2025

Agenda

1. **Background on Wood Waste Issues**
2. **Wood Waste Utilization Program Details**
3. **Plans for Biochar Use**

TWIN CITIES

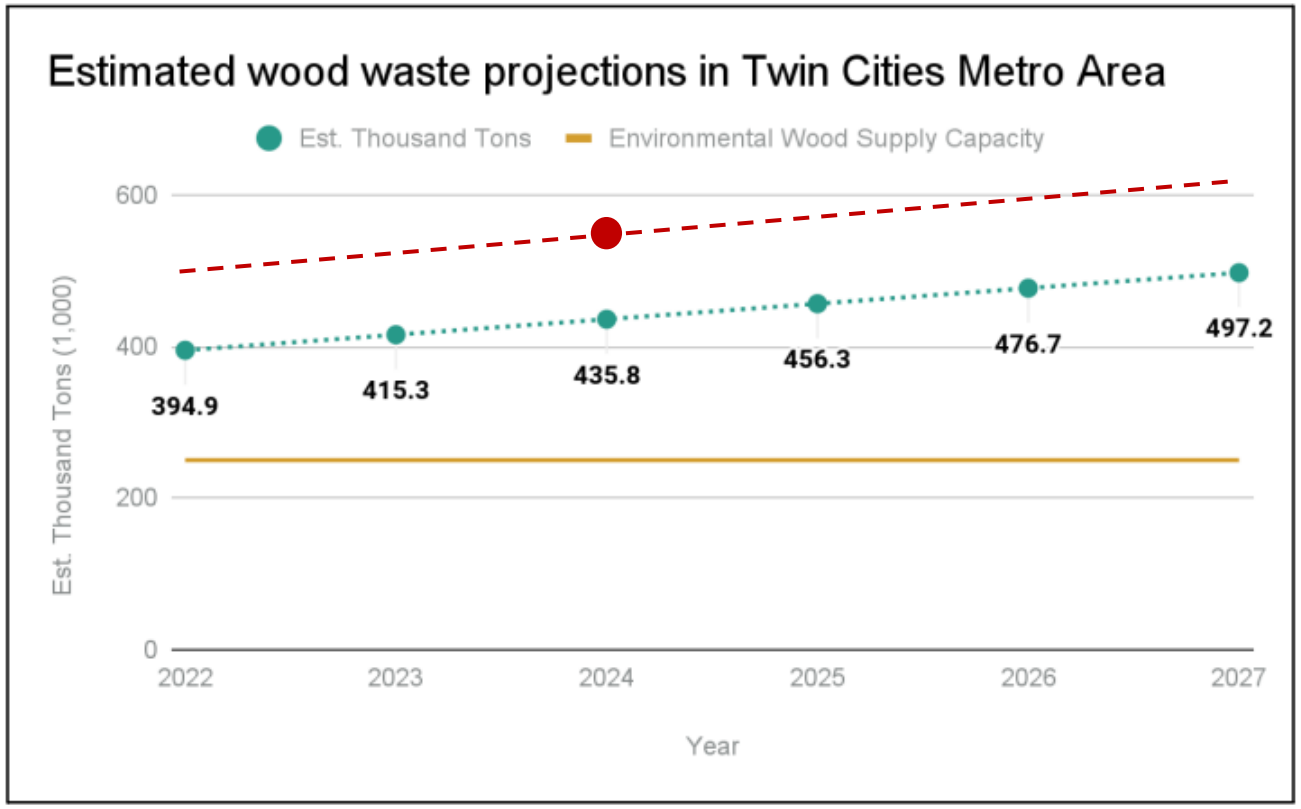
There's a huge pile of tree debris. It's growing. And there are no good solutions.

Dying and storm-felled ash trees are a major part of the 550,000 tons of annual wood waste in the metro area.

By Grace Henrie
For the Minnesota Star Tribune

OCTOBER 17, 2024 AT 1:47PM

Surging Wood Waste



- Peak of metro area wood waste from EAB is projected to be 2028. Known 2024 amounts higher than projected.
- Wood waste management system within the metro region stretched beyond capacity.
- Lack of additional capacity is resulting in open burning and resident self-management of tree trimming and disposal.

County RFP for Wood Waste Management System

Figure 4. Illustration of MPCA Wood Waste Hierarchy (Draft visual shared November 2024)

- PHE releases RFP in October 2024:

  Processing Brush and Wood to its Highest Possible End Use and Yard Waste Processing

- Services sought are aligned with the MPCA wood waste hierarchy.

- Services are for North Environmental Center yard waste site, internal county wood waste, and future central site.

New Contracts

Service
Log Recovery
Stationary Biochar Processing
Biochar Equipment & Service
Trailside Biochar Processing
Leaves/Grass
Grinding & Firewood*
Wood utilization consulting

Commercial Woody Material Collection

- Tree care companies now burning for disposal.
- Private landowner partnership opportunity identified in Hugo.
- Partnership will **recover logs** and **create biochar**.

Tree companies register to use site, trucks are measured and tagged for quicker delivery at future drop-offs.

Tree companies commit to recover logs where able and to educate customers about wood reuse options.

Trucks drop logs first and remaining load is scanned.

Tipping fee billed on material not recovered.

Unrecoverable material processed into ***biochar*** by contractor using County's biochar equipment.

Logs are inspected for metal and shipped to manufacturers.

Manufacturer makes logs into pallets; shipped back to TC.

Durable wood products are the highest hierarchy level for wood utilization.

Biochar benefits for natural and working lands and carbon sequestration offsets.

Any biochar revenue pays off costs of *machine purchase*.

Washington County

Emerging Solutions

- Biochar unit identified by PWE/Cambium report as viable wood utilization tool.
- Oregon study of device technology:
  - PM2.5 reduced by 75-83% compared to open burning or pile burning.
- Eliminates grinding step of processing.
- 90% volume reduction vs ~70% for grinding.
- Equipment can be hauled between sites.
- Local interest developing for biochar.
- Makes log recovery system possible.

Table 4. Evaluation Summary of Proposed Near-Term Strategies to Increase Wood Utilization

Proposed Strategy	Amount of Material Managed (tons)	Carbon Sequestration[a]	Economic Efficiency (Cost per ton)	Policy Readiness[b]
Bioenergy: Purchasing a "turn-key" energy recovery unit for campus heating and power	**High** >15,000	**Low**	**Low** >$75	**Medium**
Durable Wood Products: Partnering with a local start-up using wood waste in carbon dioxide removal (CDR) projects	**Medium** 5,000-15,000	**High**	**Medium** $25-$75	**Medium**
Durable Wood Products: Partnering with a major wood pallet producer in the region	**Low** 1,000-5,000	**High**	**High** <$25	**High**
Soil Amendments: Purchasing a "turn-key" modular biochar unit (e.g., air curtain burner) for use at an existing wood yard	**Medium** 5,000-15,000	**Medium**	**High** <$25	**Medium**
Bioenergy: Supplying woody biomass to refuse-derived fuel plants	**High** >15,000	**Low**	**High** <$25	**Low**

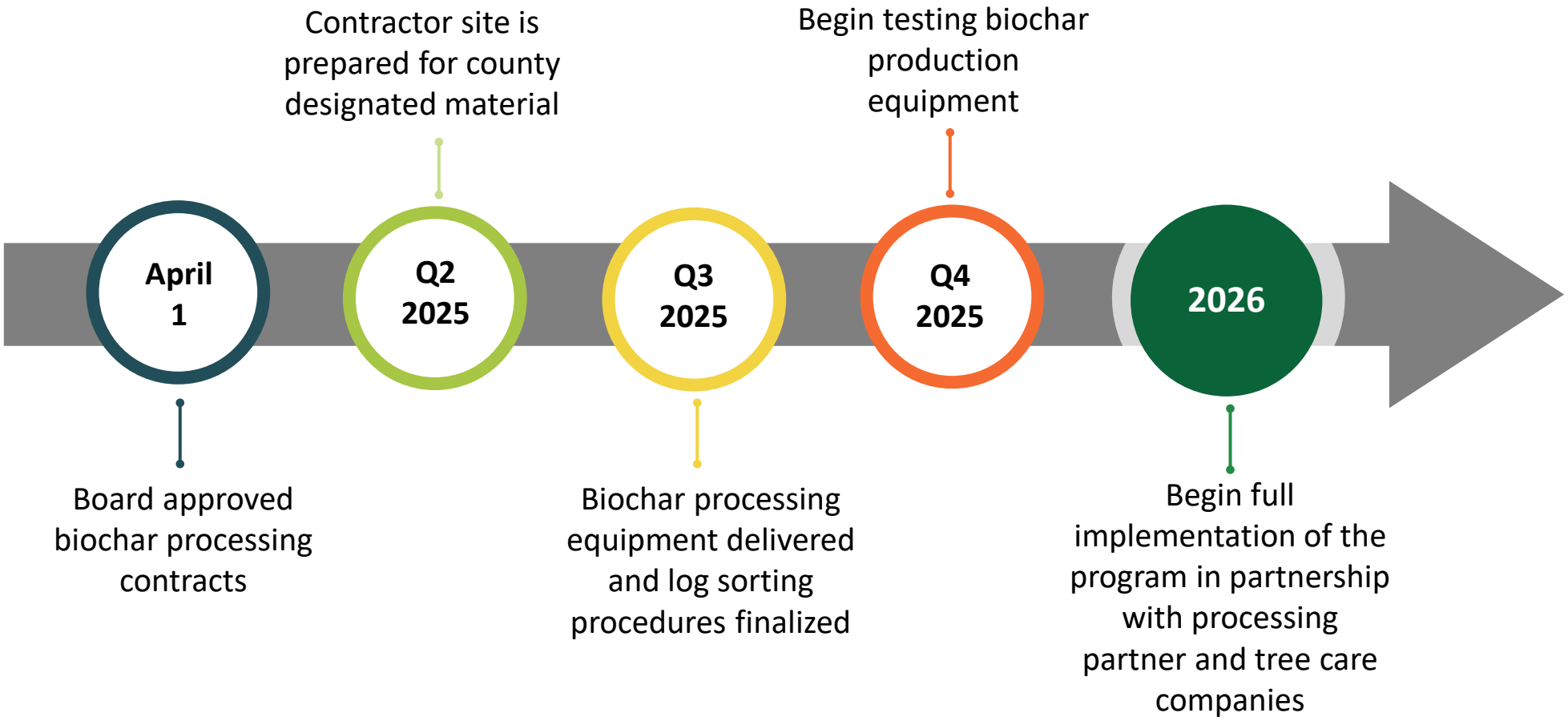
[a]The carbon sequestration criteria mirrors guidance outlined in the Wood Waste Hierarchy (see Figure 4). CDR was characterized as a durable wood product and is not considered in the Wood Waste Hierarchy.
[b] See Table 3 for more information on the criteria used for policy readiness

Biochar Processing Equipment

Wood Based Biochar

- High durability and porosity.
- Suitable for soil health and water quality improvement applications.
- Stable carbon sequestering structure.
- Estimated annual biochar production: ~8,000 yd^3

Biochar Production Site Establishment Timeline



Biochar Use Plans

- Applied for LCCMR 2026 funding for additional biochar processing equipment
- Goal: use biochar locally for water quality or soil health improvement.
- Will measure effectiveness of contaminate removal as applicable.
- Life cycle analysis of beneficial uses of biochar derived from wood waste.
- Equipment and site set up: mid 2026
- Biochar deployment projects: late 2026-mid 2027
- Identified state requirements:
  - Air permit for production equipment (MPCA)
  - Soil amendment product registration for biochar when used for soil projects (MDA)